Amendments to the Claims

The listing of claims replaces all prior versions, and listings, of claims in the application.

LISTING OF CLAIMS:

1 (Currently Amended). A system for improving transmission of ~~DSL~~ Digital Subscriber Line (DSL) signals, the system comprising:

a plurality of loop extenders coupled to a plurality of local loops for amplifying upstream and downstream DSL signals transmitted over a first local loop and a second local loop selected from the plurality of local loops;

a central office controller/power supply having a first node coupled to ~~a~~ the first local loop of the plurality of local loops and having a second node coupled to ~~a~~ the second local loop of the plurality of local loops for providing power ~~to~~ by supplying a supply voltage between the first local loop and the second local loop; and

a loop extender communications/power supply coupled to the central office controller/power supply via the first local loop and the second local loop for receiving power ~~via~~ by loading the supply voltage between the first local loop and the second local loop, and coupled to the plurality of loop extenders for providing power to the plurality of loop extenders.

2. (Original). The system of claim 1, wherein the central office controller/power supply is coupled to the first local loop via a first transformer and coupled to the second local loop via a second transformer.

3. (Original). The system of claim 2, wherein the central office controller/power supply includes a central office power supply, a positive node of the central office power supply being inductively coupled to a center tap of the first transformer and a negative node of the central office power supply being inductively coupled to a center tap of the second transformer.

4. (Original). The system of claim 1, wherein the loop extender communications/power supply is coupled to the first local loop via a third transformer and coupled to the second local loop via a fourth transformer.

5. (Original). The system of claim 4, wherein the loop extender communications/power supply includes a loop extender power supply, a positive node of the loop extender power supply being inductively coupled to a center tap of the third transformer and a negative node of the loop extender power supply being inductively coupled to a center tap of the fourth transformer.

6. (Original). The system of claim 5, wherein the loop extender power supply is coupled to the plurality of loop extenders for providing power to the plurality of loop extenders.

7. (Original). The system of claim 1, wherein:

the central office controller/power supply includes

a first modem for communication with the plurality of loop extenders,

a processor coupled to the first modem, and

loop extender management software executable by the processor for generating control signals; and

the loop extender communications/power supply includes

a second modem for communication with the central office controller/power supply.

8. (Original). The system of claim 7, wherein the first modem is coupled to the first local loop via a first transformer and coupled to the second local loop via a second transformer, and the second modem is coupled to the first local loop via a third transformer and coupled to the second local loop via a fourth transformer.

9. (Original). The system of claim 7, wherein the first modem is coupled to a center tap of the first transformer via a first capacitor and coupled to a center tap of the second transformer via a second capacitor, and the second modem is coupled to a center tap of the third transformer via a third capacitor and coupled to a center tap of the fourth transformer via a fourth capacitor.

10. (Original). The system of claim 9, wherein a fifth transformer couples the first capacitor and the second capacitor to the first modem, and a sixth transformer couples the third capacitor and the fourth capacitor to the second modem.

11. (Original). The system of claim 10, wherein the first modem and the second modem communicate in a voice-frequency band.

12. (Original). The system of claim 8, wherein the processor sends the control signals to the first modem for transmission over the first local loop and the second local loop.

13. (Original). The system of claim 12, wherein the second modem receives the control signals and broadcasts the received control signals to the plurality of loop extenders via the plurality of local loops.

14 (Currently Amended). The system of claim 13, wherein each loop extender of the plurality of loop extenders includes:

a ~~POTS~~ Plain Old Telephone Service (POTS) loading coils coupled to a local loop of the plurality of local loops;

DSL amplification circuitry coupled to the local loop via bypass switches;

an analog multiplexer/analog-to-digital converter (AMADC) coupled to the DSL amplification circuitry via diagnostic lines and control lines for sampling

DSL signals via the diagnostic lines and controlling the DSL amplification circuitry via the control lines; and

a diagnostic/control processor (DCP) coupled to the local loop and the AMADC for processing the control signals received via the local loop and processing the sampled DSL signals from the AMADC.

15. (Original). The system of claim 14, wherein the DCP processes the sampled DSL signals to compute average power.

16. (Original). The system of claim 14, wherein the DCP processes the sampled DSL signals to compute peak power.

17. (Original). The system of claim 14, wherein the DCP processes the sampled DSL signals to compute root-mean-square power.

18. (Original). The system of claim 14, wherein the DCP processes the sampled DSL signals to compute power spectral density.

19. (Original). The system of claim 14, wherein each loop extender of the plurality of loop extenders includes a bypass relay for coupling the DCP to the bypass switches.

20. (Original). The system of claim 19, wherein the DCP, upon processing the control signals, uncouples the DSL amplification circuitry from the local loop by activating a deactivated bypass relay.

21. (Original). The system of claim 19, wherein the DCP, upon processing the control signals, couples the DSL amplification circuitry to the local loop by deactivating an activated bypass relay.

22. (Original). The system of claim 14, wherein the DCP, upon processing the control signals, instructs the AMADC to select switch states of the DSL amplification circuitry for improving performance of the DSL amplification circuitry.

23. (Original). The system of claim 14, wherein the DCP, upon processing the sampled DSL signals, instructs the AMADC to select switch states of the DSL amplification circuitry for improving performance of the DSL amplification circuitry.

24. (Currently Amended). A method for improving transmission of DSL signals, the method comprising the steps of:

amplifying upstream and downstream DSL signals transmitted over a first local loop and a second local loop selected from a plurality of local loops via a plurality of loop extenders coupled to the plurality of local loops;

providing power to a loop extender communications/power supply ~~via a~~ by supplying a supply voltage between the first local loop of the plurality of

local loops and via ~~a~~ the second local loop of the plurality of local loops for providing power to the plurality of loop extenders;

sending control signals to a loop extender communications/power supply via the first local loop and via the second local loop, receiving the control signals, and

broadcasting the control signals to the plurality of loop extenders.

25. (Original). The method of claim 24, wherein the control signals are broadcast in a voice-frequency band.

26. (Original). The method of claim 24, wherein each loop extender, upon receiving a broadcast control signal, samples DSL signals.

27. (Original). The method of claim 26, wherein each loop extender processes the sampled DSL signals to compute average power.

28. (Original). The method of claim 26, wherein each loop extender processes the sampled DSL signals to compute peak power.

29. (Original). The method of claim 26, wherein each loop extender processes the sampled DSL signals to compute root-mean-square power.

30. (Original). The method of claim 26, wherein each loop extender processes the sampled DSL signals to compute power spectral density.

31. (Original). The method of claim 24, wherein the method further includes the step of amplifying upstream and downstream DSL signals via DSL amplification circuitry.

32. (Original). The method of claim 31, wherein each loop extender, upon receiving a broadcast control signal, uncouples the DSL amplification circuitry from the local loop.

33. (Original). The method of claim 31, wherein each loop extender, upon receiving a broadcast control signal, couples the DSL amplification circuitry to the local loop.

34. (Original). The method of claim 24, wherein each loop extender, upon receiving a broadcast control signal, selects switch states of the DSL amplification circuitry according to the broadcast control signal for improving performance of the DSL amplification circuitry.

35. (Original). The method of claim 24, wherein each loop extender, upon receiving a broadcast control signal, samples the DSL signals and selects switch states of the DSL amplification circuitry according to the sampled DSL signals for improving performance of the DSL amplification circuitry.

36. (Original). A system for improving transmission of DSL signals, the system comprising:

means for transmitting DSL signals;

means for amplifying the transmitted DSL signals;

first means for providing power to the means for amplifying;

second means for providing power via the means for transmitting DSL signals to the first means for providing power;

means for controlling the means for amplifying to improve performance of the means for amplifying;

means for broadcasting to the means for controlling; means for generating control signals;

means for sending the control signals via the means for transmitting DSL signals to the means for broadcasting.

37. (Currently Amended). A system for improving transmission of DSL signals, the system comprising:

a plurality of local loops, including

a first local loop for transmitting control signals and power, and

a second local loop for transmitting control signals and power;

a plurality of loop extenders for amplifying DSL signals, coupled to the plurality of local loops, each loop extender including

a POTS loading coils coupled to a local loop from the plurality of local loops,

DSL amplification circuitry coupled to the local loop via bypass switches,

an AMADC coupled to the DSL amplification circuitry via diagnostic lines and control lines, for sampling DSL signals via the diagnostic lines and controlling the DSL amplification circuitry via the control lines, and

a DCP coupled to the local loop and the AMADC for processing the control signals received via the local loop and processing the sampled DSL signals received via the AMADC;

a loop extender communications/power supply coupling the first local loop and the second local loop to the plurality of loop extenders for providing power and broadcasting the control signals to the plurality of loop extenders, the loop extender communications/power supply including

a second modem for communication with the plurality of loop extenders; and

a central office controller/power supply coupled to the first local loop via a first transformer and coupled to the second local loop via a second transformer for providing power to the loop extender communications/power supply, generating the control signals, and sending the control signals to the loop extender communications/power supply, the central office controller/power supply including

a first modem for communication with the loop extender communications/power supply,

a processor coupled to the first modem, and

loop extender management software executable by the processor for generating the control signals wherein the power or the control signals are supplied as a voltage between the first local loop and the second local loop.

38. (Original). The system of claim 37, wherein the first modem and the second modem communicate in a voice-frequency band.

39. (Original). The system of claim 38, wherein the processor sends the control signals to the first modem for transmission over the first local loop and the second local loop.

40. (Original). The system of claim 39, wherein the second modem receives the control signals and broadcasts the received control signals to the plurality of loop extenders via the plurality of local loops.

41. (Original). The system of claim 40, wherein the DCP processes the sampled DSL signals to compute average power.

42. (Original). The system of claim 40, wherein the DCP processes the sampled DSL signals to compute peak power.

43. (Original). The system of claim 40, wherein the DCP processes the sampled DSL signals to compute root-mean-square power.

44. (Original). The system of claim 40, wherein the DCP processes the sampled DSL signals to compute power spectral density.

45. (Original). The system of claim 40, wherein each loop extender further includes a bypass relay for coupling the DCP to the bypass switches.

46. (Original). The system of claim 45, wherein the DCP, upon receiving control signals, uncouples the DSL amplification circuitry from the local loop by activating a deactivated bypass relay.

47. (Original). The system of claim 45, wherein the DCP, upon receiving control signals, couples the DSL amplification circuitry to the local loop by deactivating an activated bypass relay.

48. (Original). The system of claim 40, wherein the DCP, upon receiving control signals, instructs the AMADC to select switch states of the DSL amplification circuitry for improving performance of the DSL amplification circuitry.

49. (Original). The system of claim 40, wherein the DCP, upon processing the sampled DSL signals, instructs the AMADC to select switch states of the DSL amplification circuitry for improving performance of the DSL amplification circuitry.